

Sandia scientists get a handle on clouds

By PETER WEISS

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LIVERMORE — Like the proverbial blind men feeling different parts of an elephant, climate scientists have been stymied by the inconsistencies of clouds.

But a month-long experiment that ended Wednesday has put the "hands" of cloud researchers on the same part of the same cloud at the same time, said researchers from Sandia/California National Laboratories. That unprecedented achievement promises to give climate researchers a better understanding of how clouds affect climate, they said, perhaps leading to more precise estimates of potential global warming in the next century. But new political realities also threaten to end the \$10 million-per-year program that sponsored the experiment.

"Our hypothesis is that there's more energy absorbed in clouds than previously thought," said Sandia/California aerospace engineer Will Bolton, deputy technical director for the research effort, which involves about 20 people from his lab. That's not an entirely new suspicion. A number of scientific studies have suggested it, including one involving Lawrence Livermore Laboratory scientists that was published early this year.

To test the notion, Bolton and collaborators from Livermore lab, NASA and other government and university labs sent a pair of uniquely outfitted airplanes into the Midwestern skies to measure solar radiation striking clouds from above and below. By tapping into global-positioning satel-

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lites that pinpoint locations on Earth to within a few yards, the two propeller-driven aircraft were able to fly — one above a cloud and the other beneath it — in near-perfect synchronization.

That meant they were taking data on the same section of the cloud at the same time, so the difference in energy from top to bottom would have real meaning.

NASA had tried to do the same thing with jets whose pilots would watch each other out the window to stay aligned. But the planes would end up straying miles apart, Bolton said. While one checked out the tail of the cloud, the other might be at its "trunk."

In the latest tests, a German-built reconnaissance plane called an Egrett — sort of a poor man's U-2 — took the high road, skimming the cloud tops at 43,000 feet. Down below, a more conventional Twin Otter, which looks like a short-haul commuter plane, simultaneously pointed its instruments upward.

In six-hour stints, the planes crisscrossed a

swath of northern Oklahoma and south-central Kansas that attracts climate researchers both because it has extreme weather and because its location in "tornado alley" has already made it home to a vast array of meteorological instruments.

Good weather almost spoiled things, but clouds finally moved during five days near the end. "I think that will be enough data to test the models conclusively," said University of Maryland meteorologist Robert Ellingson, a member of the scientific team.

By "models," he means the complex computer programs that simulate the behavior of Earth's climate on supercomputers. Climate experts have tried using them to predict how much Earth would warm if levels of carbon dioxide and other "greenhouse" gases continue to build up in the atmosphere. One of the major points of disagreement between various models is the effect of clouds, Bolton said.

Next spring, researchers plan to return to Oklahoma with a new robot plane that should extend their cloud monitoring to full, 24-hour day/night cycles.

But, to make clouds even more realistic in the models, the sponsoring program would like to carry out similar experiments the next year over the tropical Pacific Ocean and in Alaska.

"In the current political climate, that's a real challenge," Bolton said. The Pentagon, which has been the main funding source, is dropping its support in a year. The new Congress has also targeted global climate research as "liberal claptrap."